



**Additive is competitive**

Additive Manufacturing turnkey solutions

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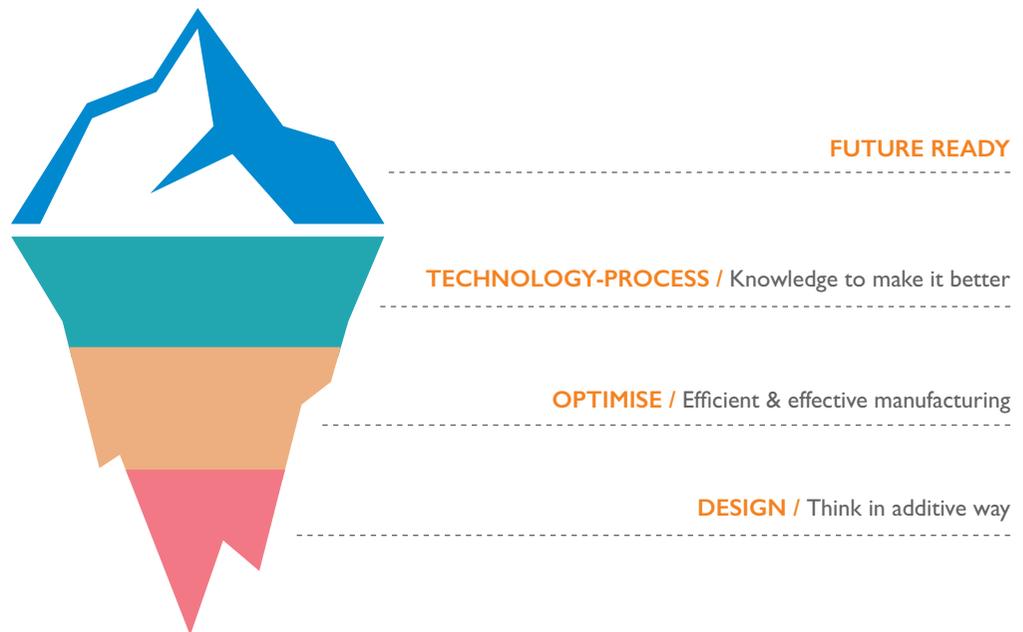
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# Next level. Next to you.

The rapidly evolving field of **Additive Manufacturing** has still only touched the tip of the iceberg in terms of maturity, with significant progress still to be made in all areas, not limited to development of design, software, processes, materials, equipment and services.

In line with the **Prima Industrie philosophy**, **Prima Additive is next to you as your partner offering a unique, full turnkey solution through this journey.** Supporting you in all areas of additive powder bed fusion and direct energy deposition from design and application support through to provision of equipment with our long established global service network.

Our team of experts will always be available to listen, collaborate, assist and advise you.



## What can be found in this brochure

**Metal powder bed fusion laser technology** for printing 3D components.

**Direct energy deposition technology** for printing 3D components, coatings and repair.

An introduction to our **Application and Innovation Centre** to discover our method adapted to your needs to assist you in developing functional components.

A specialised and experienced **sales and service network**, always next to you and speaking your language, with both remote and field support.

# Additive is Competitive

Prima Additive, a division of Prima Industrie, is a leading specialist in Additive Manufacturing processes, systems and solutions worldwide. **Prima Additive is the unique manufacturer worldwide offering the full range of metallic laser Additive Manufacturing technologies, namely: powder bed fusion and direct energy deposition, as well as full application support and global service.**

## EXPERIENCE

A Group with over 40 years of experience and more than 13,000 installed machines.

## INNOVATION

An expert Research & Development team committed to research the most competitive technology for our customers.



## GLOBAL

More than 80 countries where you can obtain our specialised sales, application and services support in your language.

## SUPPORT

Application centre focused on support services in design, re-engineering, prototyping, processes and materials.

**Additive is competitive** – the Prima Additive philosophy is our commitment to advancing the industry by reducing barriers to entry in Additive Manufacturing.

# What does “Additive is Competitive” mean?



## Turnkey solutions

A one stop shop with installation, training and know-how transfer for all equipment and machinery.  
An investment with the key in your hands



## Expertise and consulting

Complete application support: part re-engineering and design, process optimisation and configuration, extensive part testing and standards compliance



## Prototyping

Supporting you in design for additive, we can design and build your prototype in our application centre



## Global services and support

Global assistance with local support speaking your language



## Industry 4.0

Additive Manufacturing machinery as part of factory of the future – open data platform, resource planning and remote assistance



## Printing quality

Excellent part quality for a wide range of materials combined with high process reliability and repeatability



## Flexibility and low costs

High flexibility in use: printing in a wide range of materials, open process parameters and simple operation.  
Low investment and maintenance costs. Best price to performance ratio in the market today

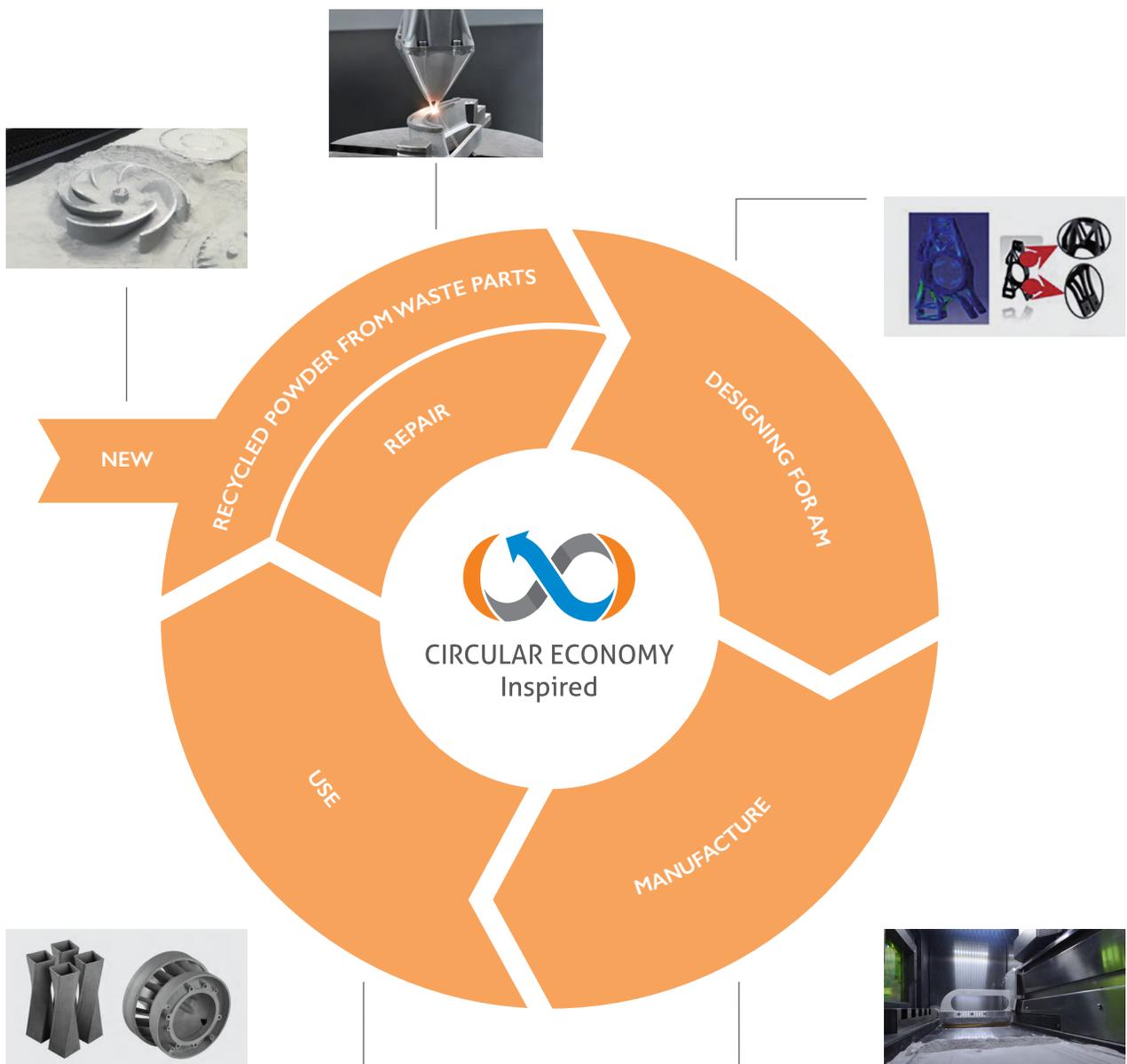
# Circular Economy in industrial applications

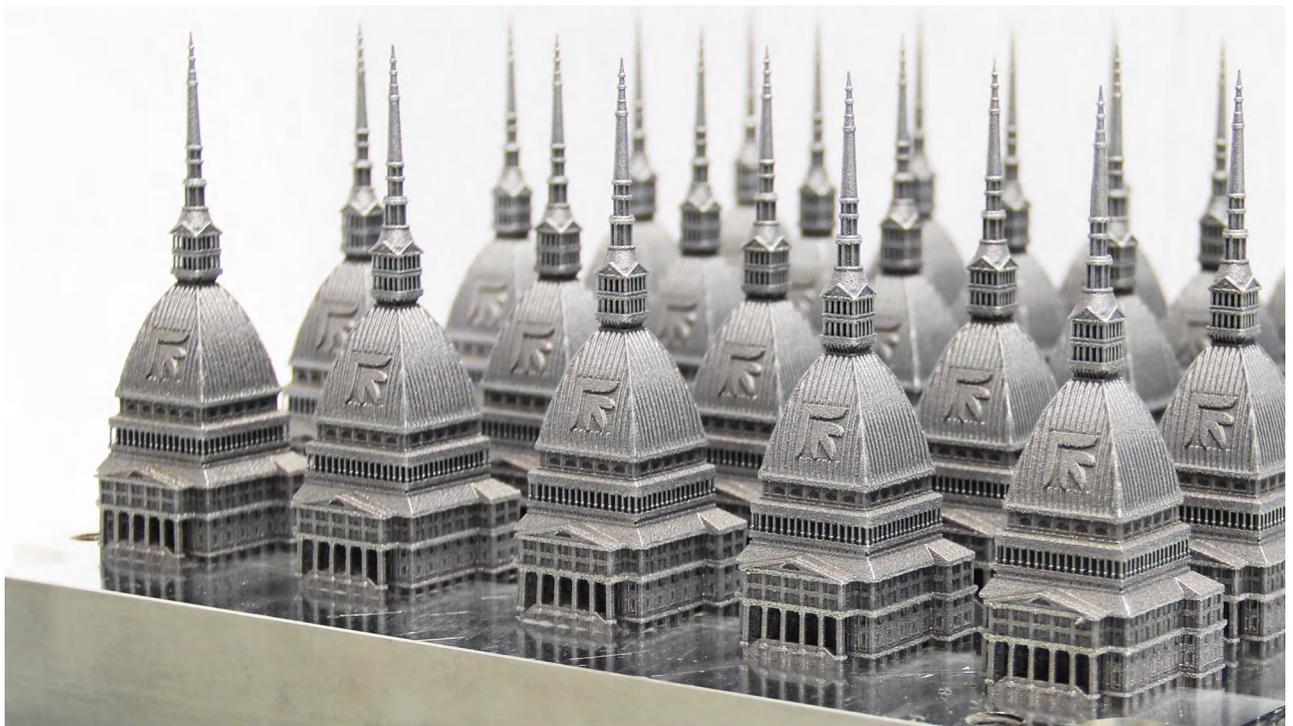
Prima Additive approach is inspired by the Circular Economy vision as the strategic mean to fully exploit the value of Additive.

Circular Economy in terms of:

- **Design strategies** for extending product lifecycle
- **Optimised processes** to use resources more efficiently
- **Remanufacturing** to return a used product to its original performances
- **Recycling of powders** to close the material loop.

In a circular economy, the value of products and materials is maintained for as long as possible. Waste and resource use are minimised, and when a product reaches the end of its life, it is used again to create further value. This can bring major economic benefits.





# Prima Additive Application and Innovation Centre

BRINGING ADDITIVE MANUFACTURING CLOSER TO INDUSTRY

The new Prima Additive Application and Innovation Centre in Turin provides a fully equipped area where you can **familiarise yourself with Additive Manufacturing technologies** to increase your exposure and knowledge. Facilitating training and knowledge sharing, our specialist groups of engineers are always next to you. You have a unique opportunity to see first-hand the capabilities of the technology and we can together identify how to rapidly **deploy it in your business in the most competitive manner**.

## STEP 1 PRE-PROCESS



## STEP 2 IN-PROCESS



## STEP 3 POST-PROCESS



## Consider our Application Centre as your personal Additive Manufacturing knowledge centre

Access to Prima Additive machinery and expertise for developing your ideas

Application consultation and preparation

Support on your product costing and scheduling

Basic training on preparing data and handling the machines

Safety training for additive processes

Powder supply either from Prima Additive or support to qualify your own powders

Supporting you to print your prototypes on our machines

Supporting you in designing for Additive (re-engineer your products to improve cost and performance)

Process qualification and documentation support

Developing your machinery and pre/post processing equipment business case with you

With a long-standing experience in laser systems and a wide support and services network Prima Additive can transfer the entire know-how to your site and ensure a smooth and efficient transition of your production.

# Make your business future-ready in five steps

PRIMA ADDITIVE METHODOLOGY OF APPLICATIONS

## Case Analysis

## Process and material evaluation

### PRIMA ADDITIVE & CLIENTS MEETINGS

Always next to the customer Prima Additive application engineers will guide you through a concrete approach to evaluate your case, reengineer your products, realise your prototypes and transfer to you the “know how” created.

Initial estimation on key aspects of the process

Printing strategy simulations

Feasibility and sustainability report

Experimentation for obtaining process parameters

Realization of samples with the required material



STEP 1



STEP 2

## Realization of the prototype in Prima Additive machines

Select appropriate process and machine parameters

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Fabrication of the prototype

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Repeatability of the printing procedure



STEP 3

## Evaluation and characterization of the parts

Verification of quality targets

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Obtain mechanical and thermal properties

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Guidance to post-process phases



STEP 4

## Reporting & "know how"

Customer manual (process details and application)

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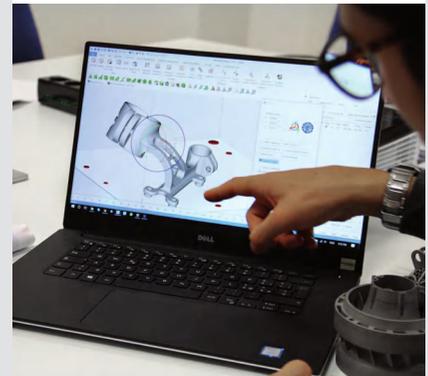
Optimization of process techniques

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Know-how exploitation

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Advanced training



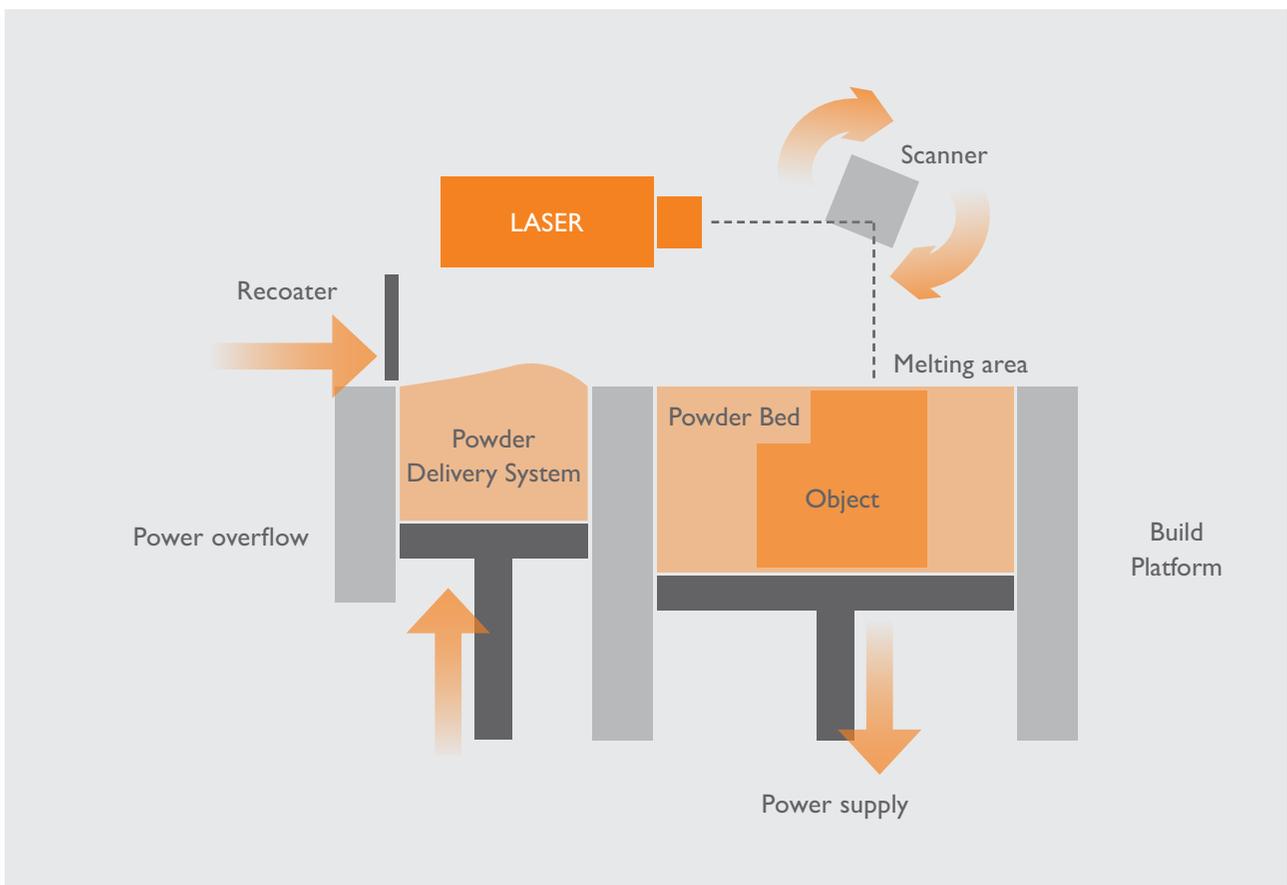
STEP 5

# Inventing your future products with Powder Bed Fusion

TECHNOLOGY PRINCIPLE: LAYER BY LAYER FABRICATION



Powder bed fusion process uses thermal energy to melt specific points on a layer of metallic powder. The thermal energy - produced from a laser source - melts the powder material, which then solidifies as it cools and this way, each area of the part is manufactured. The part is built up into layers and so this process is repeated for each layer to create the part. After the melting of one layer, the platform lowers, and the powder recoater deposits a new layer.



## Our application approach

We support the identification of components with Additive Manufacturing potential

Guidance and consultation for your Additive Manufacturing business case and providing you with a feasibility and sustainability report

Concepts for (re)design & (re)engineering

## Evaluation map

CURRENT OPERATION & MANUFACTURING DETAILS	QUALITY TARGETS	COSTS AND PRODUCTION TIME
Weight and dimensions	Tolerances	Lead/production time for each part
Part location & function	Roughness	Typical cost per part
Type of application	Hardness	Typical cost of prototype
Current production method and volume	Mechanical/thermal strength	
Typical operating conditions	Other part related metrics	

## Re-engineering and re-design of your component

Supporting and training you in your design for additive journey creating new innovative shapes not possible through traditional methods.

Key to making additive competitive is not to just proto-type or replace existing parts but to fully redesign components and sub-assemblies and create value through cost, weight, performance and time to market.

## (Re)Design approach

1 <sup>ST</sup> PHASE	2 <sup>ND</sup> PHASE	3 <sup>RD</sup> PHASE
Identify component from feasibility report	Topology optimization	Creation of new CAD models
Investigate new features	Mechanical and thermal simulations	Validation and testing
Investigate combining components	Optimisation based on several criteria (weight, volume, stiffness)	Printing strategy development
Design areas to facilitate easier printing	Design iterations for optimal manufacturing	



## Advantages



Manufacturing of complex geometries



Cost and part weight reduction



No tooling requirements



Efficient material usage



Customised parts

## Process characterisation and prototyping

After the finalisation of the design and print strategy, Prima Additive focuses on the optimum selection of the process parameters. Performing a series of standard testing, Prima Additive application engineers are in a position to optimise the process aspects for each case and ensure the expected mechanical properties. The first prototype is then realised.



Prima Additive powders are extensively tested to give a good understanding of the mechanical characteristics of the part. We will also support you to supply your own materials and train you to configure the optimum process and machine parameters.

## Managing prototype

- Building your prototype in our application centre
- Post treatment support for hardness, stress relief, part removal and surface finishing
- Testing and measurement

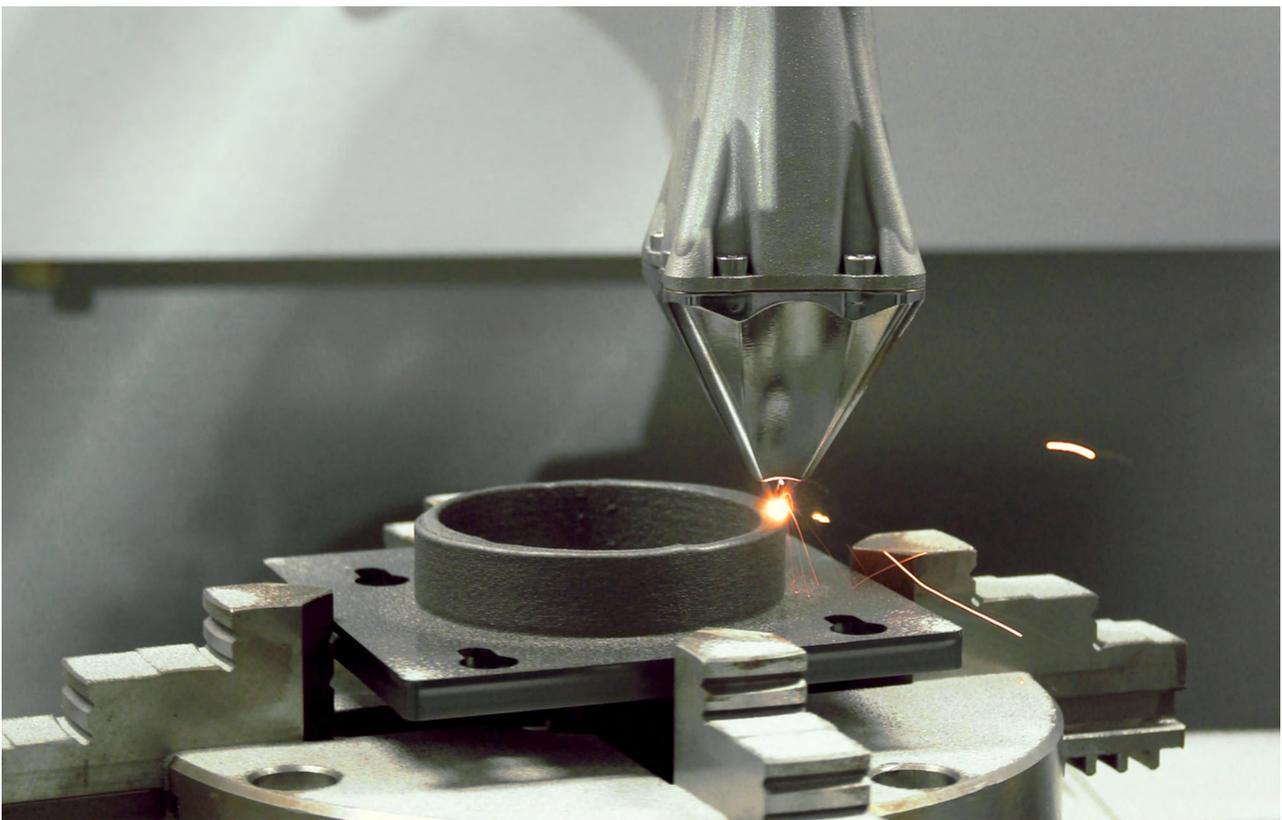
We provide you with an application manual of tasks required to produce your components. This guide assists process replication, optimisation and machine configuration. We are always next to you to explore how to improve your products.

# Customise, coat & repair large parts with Direct Energy Deposition

TECHNOLOGY PRINCIPLE: HIGH BUILD RATE



The direct energy deposition process uses focused thermal energy generated from a laser source to fuse powder metal sprayed at the focal point of the laser beam. This laser beam melts the deposited powder to the component. The laser is coaxial to the deposition head which moves in 3 to 5 simultaneous axes. A rotary tilt table can also be installed in order to keep the melt pool created in a horizontal plane. This capability makes the process suitable for adding features to existing parts as well as for repairs and coatings.



## Our expertise is your deposition experience

Together evaluate each application and design tailored solutions

Guidance and consultation for your Additive Manufacturing business case and providing you with a feasibility and sustainability report

Concepts for your specific application requirements

## Evaluation map

CURRENT OPERATION & MANUFACTURING DETAILS	QUALITY TARGETS	COSTS AND PRODUCTION TIME
Weight and dimensions	Tolerances	Lead/production time for each part
Part location & function	Roughness	Typical cost per part
Type of application and parts volume	Hardness	Typical cost of prototype
Failure cause	Mechanical & thermal fatigue	
Typical operating conditions	Anti-corrosion requirements	

## Engineering Process

1 <sup>ST</sup> PHASE	2 <sup>ND</sup> PHASE	3 <sup>RD</sup> PHASE
Identify suitable applications from feasibility report	Reverse engineering – 3D scanning	Creation of the final CAD model
Investigate new features	Creation of CAD model	Validation and testing
Evaluate suitable part handling and equipment	Redesign for adding functionality	Build strategy development
Evaluate base and deposited materials	CAD model iterations for optimal manufacturing	



## Advantages



Depositing on existing parts to add custom features, coatings and repair



Extended product lifecycle with repair or coatings



Minimal tooling requirements



Efficient material usage



Multi-material capabilities



Equipment automation options

## Process and material evaluation

After the finalisation of the design and build strategy, Prima Additive focuses on the characterisation of the materials and the process to ensure the optimum parameters. Performing a series of standard testing, Prima Additive application engineers are in a position to optimise the process for each case and model the expected mechanical properties on the actual part, with the ability to provide our standard recipes for our materials or support in creating new material recipes. This proven process is shared with you in order to ensure you have a stable and repeatable process.

## Managing the build process

- Verification of quality and performance targets
- Guidance and automation options in post-process activities

We provide you with an application manual of tasks required to support your process. This guide assists process replication, optimisation and machine configuration. We are always next to you to explore how to improve your products.

# Prima Additive product range



## POWDER BED FUSION



### 150 Family

One platform, three different models: Print Sharp 150, Print Genius 150, Print Green 150, available with one or two lasers, also with green laser for pure copper



1 or 2 x 300 W IR  
200 W Green



Build volume:  $\varnothing$  150x160 mm

Build rate: 2 - 50 cm<sup>3</sup>/h



### Print Sharp 250

A robust machine for exploring the potentiality of additive manufacturing. The ideal solution in terms of price/performance ratio.



Fiber 500 W



Build volume: 258x258x330 mm

Build rate: 12 - 30 cm<sup>3</sup>/h



### Print Genius 250

An optimized solution for production thanks to the multi laser technology. Two lasers that works simultaneously to decrease the manufacturing time.



Fiber 2x500W



Build volume: 258x258x350 mm

Build rate: 24 - 50 cm<sup>3</sup>/h



## DIRECT ENERGY DEPOSITION



### Laserdyne 811

Suitable to handle large-scale components with fast and qualitative results. Flexible to accommodate different options for machine and process set up depending on application.



Fiber 1-6 kW



Working volume: 1,100x800x600 mm

Deposition rate: Max 100 cm<sup>3</sup>/h



### Laser Next 2141

The multi-purpose solution with advanced technology for fabrication, repairing and customization of large-scale parts.



Fiber 1-6 kW



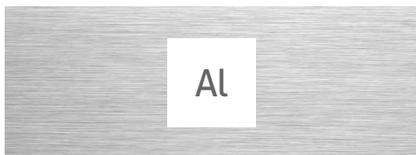
Working volume: 4,140x2,100x1,020 mm

Deposition rate: Max 100 cm<sup>3</sup>/h

# Compatible materials

**Prima Additive** are constantly striving to improve materials technology, machines and processes to support you to qualify your powder. We develop the correct process parameters and set an optimal configuration for your machine to ensure quality and repeatability.

## Aluminum Alloys



Al

AISI 10Mg

High thermal conductivity, high mechanical properties (strength and hardness), high electrical conductivity, good post process finishing, excellent corrosion resistance and low density

### Application sectors

Aerospace  
Automotive  
Mechanical components

## Steel Alloys



Fe

316L, Maraging M300, 17-4PH

Excellent strength under elevated temperature combined with high corrosion resistance, hardness as well as high ductility, high post process finishing and good thermal properties

### Application sectors

Oil and Gas / Food Industries  
Aerospace / Automotive  
Biomedical / Chemical  
Mechanical components

## Titanium Alloys



Ti

Ti-6Al-4V

Low specific weight combined with low thermal conductivity and expansion, excellent mechanical properties, high biocompatibility and high corrosion resistance

### Application sectors

Aerospace  
Automotive  
Medical / Dental

## Nickel Alloys



Ni

In625, In718, Hastelloy X

High yield, fatigue and creep strength with excellent anti-oxidation and anti-corrosion behavior in aggressive environments, high corrosion resistance at high temperatures high strength and good ductility

### Application sectors

Aerospace / Automotive  
Biomedical / Chemical  
Energy / Oil and Gas  
Mechanical / Marine

## Cobalt-chromium Alloys



CoCr

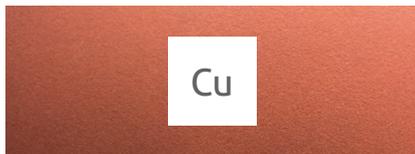
CoCr

Biocompatibility, exceptional strength and durability, and resistance to wear and corrosion

### Application sectors

Medical / Dental  
Energy / Oil and Gas  
Automotive  
Design objects / Jewelry

## Copper Alloys



Cu

CuSn10, Cu

High resistance against corrosion combined with mechanical properties and both thermal and electrical conductivity

### Application sectors

Electronics  
Aerospace  
Jewelry

# 150 Family

POWDER BED FUSION



## ONE PLATFORM, THREE MODELS

150 family is the new series of metal additive manufacturing machines for the production of small components. Available in 3 models with a build volume of  $\varnothing$  150x 160 mm: **Print Sharp 150** with single IR laser, **Print Genius 150** with two Lasers, **Print Green 150** with Green Laser for processing pure copper.



### HIGH QUALITY

Pre-heating both from the top and from the bottom of the powder bed up to 300° C to ensure better melting performance.



### EVERYTHING UNDER CONTROL

Real-time checks that analyze any defects in the metal powder layer at any time.



### ALWAYS THE RIGHT SPOT

An optical system with beam expander, to vary the size of the laser beam spot as needed, together with an automatic laser focus position on platform adjustment via software for an optimal result.



### GREEN LASER

Thanks to the green laser, available on the Print Green 150, you can work highly reflective materials such as pure copper: the ideal solution for the needs of the electronics and industrial components sectors.

# Technical Specifications

## 150 Family

<b>DIMENSIONS (LxWxH)</b>	1760 (L) - 1120 (W) - 2200 (H)
<b>WEIGHT</b>	1800 kg.
<b>POWER SUPPLY</b>	380 V / 50 Hz / 6 kW / 32A
<b>LASER (Print Sharp 150)</b>	Laser Yb (ytterbio) 300 W IR (wavelength 1070 nm) single mode
<b>LASER (Print Genius 150)</b>	2 x Laser Yb (ytterbio) 300 W IR (wavelength 1070 nm) single mode
<b>LASER (Print Green 150)</b>	Green fiber laser 200 W (wavelength 532 nm)
<b>LASER FOCUS DIAMETER</b>	35 - 100 µm (adjustable focus position)
<b>BUILDING VOLUME</b>	∅ 150 x 160 mm
<b>BEAM DEFLECTION SPEED</b>	5 m/s
<b>POSITIONING SPEED</b>	10 m/s
<b>BUILD RATE *</b>	2 - 50 cm <sup>3</sup> /h
<b>LAYER THICKNESS</b>	0.02 mm - 0.12 mm
<b>LAYER WIDTH</b>	0.1 mm (single line width)
<b>BUILDING PLATFORM Z-AXIS</b>	Travel: 210 mm / Res: 0.01 mm
<b>HEATING PLATFORM</b>	up to 300°C
<b>MONITORING OF O<sub>2</sub> LEVEL</b>	Below 100 ppm (0.01%)
<b>PERMISSIBLE ROOM TEMPERATURES</b>	15 - 30°C
<b>GAS (Consumption - running)</b>	3 L/min (running)
<b>SYSTEM FILL CONSUMPTION</b>	20 L / min. (up to filling)
<b>CAM SOFTWARE</b>	Materialise Magics / Netfabb
<b>CONTROL &amp; OTHER SOFTWARE</b>	Open / Materialise
<b>INDUSTRIAL INTERFACES</b>	Ethernet - internal web server

\* Dependent on process parameters and material used.

- Size & Power
- Laser
- Machine and additive process details
- Peripheral & auxiliaries - Software

# Print Sharp 250

POWDER BED FUSION



## PRECISE PRINTING OF COMPLEX GEOMETRIES

Print Sharp 250 is a competitive solution to guarantee reliability and quality of your printed components in your chosen materials. Equipped with easy to use control software, a fiber laser, a recirculating system and a modular scanning system the machine can meet the customer specific needs.



### FLEXIBLE

Suitable for a wide range of materials including reflective metals. An “open” system for process and machine parameter configuration.



### RELIABLE

Able to work continuously up to 200 consecutive hours ensuring the repeatability and the quality of the process.



### PROFITABLE

Low cost of ownership along with a wide network of suppliers for materials and consumables.



### USER FRIENDLY

Simple operating process, intuitive software interface as well as easy maintenance and set up activities.

# Technical Specifications

## Print Sharp 250

<b>DIMENSIONS (LxWxH)</b>	3500 (L) - 1100 (W) - 2450 (H)
<b>WEIGHT</b>	2000 kg.
<b>POWER SUPPLY</b>	380 V / 50 Hz / 8 kW
<b>TYPE OF LASER</b>	Laser Yb (Itterbio) IR single mode
<b>LASER POWER</b>	500 W
<b>LASER FOCUS DIAMETER</b>	70 – 100 µm
<b>BEAM WAVELENGTH</b>	1060 - 1080 nm
<b>BUILDING VOLUME</b>	258 x 258 x 330 mm
<b>BEAM DEFLECTION SPEED</b>	8 m/s
<b>POSITIONING SPEED</b>	10 m/s
<b>BUILD RATE *</b>	12 - 30 cm <sup>3</sup> /h
<b>LAYER THICKNESS</b>	0.02 mm - 0.1 mm
<b>LAYER WIDTH</b>	0.1 mm (single line width)
<b>BUILDING PLATFORM Z-AXIS</b>	Travel: 370 mm / Speed: max 6 mm/s / Res: 0.01 mm
<b>HEATING PLATFORM</b>	up to 200°C
<b>MONITORING OF O<sub>2</sub> LEVEL</b>	Below 100 ppm (0.01%)
<b>PERMISSIBLE ROOM TEMPERATURES</b>	15 - 30°C
<b>GAS (Consumption - running)</b>	7 L/min (running)
<b>SYSTEM FILL CONSUMPTION</b>	50 L / min. (up to filling)
<b>CAM SOFTWARE</b>	Materialise Magics
<b>CONTROL &amp; OTHER SOFTWARE</b>	Eplus control software (EPC)
<b>INDUSTRIAL INTERFACES</b>	Ethernet

- Size & Power
- Laser
- Machine and additive process details
- Peripheral & auxiliaries - Software

\* Dependent on process parameters and material used.

# Print Genius 250

POWDER BED FUSION



## DUAL LASER MACHINE FOR HIGH PRODUCTIVITY PRINTING

Print Genius 250 is a machine for additive manufacturing with a build volume of 258x258x350 mm for the fabrication of medium sized components.

It is the ideal solution for high productive metal printing applications thanks to its dual 500W laser and intelligent control and operating software for quick part orientation and machine functions definition.

Complete material change capability in less than 2 hours due to modular and easily removable components.



### PRODUCTIVE

The two lasers work simultaneously to improve the production time. Possibility to work with single laser printing mode. Small parts could be printed in the same job using just one laser.



### USER FRIENDLY

A total new HMI, intuitive, easy to use also for a non expert operator with the possibility to check and report the key printing parameters.



### EFFICIENT

Improved gas recirculation system to reduce the purge time to fill the chamber to 25 minutes and reduce gas consumption during the process.



### SAFE

Equipped with two line of I+I filter solution that increases the filter lifetime, decrease the frequency of changing cartridges, and allow to change the filter during the process thanks to the removable cylinder.

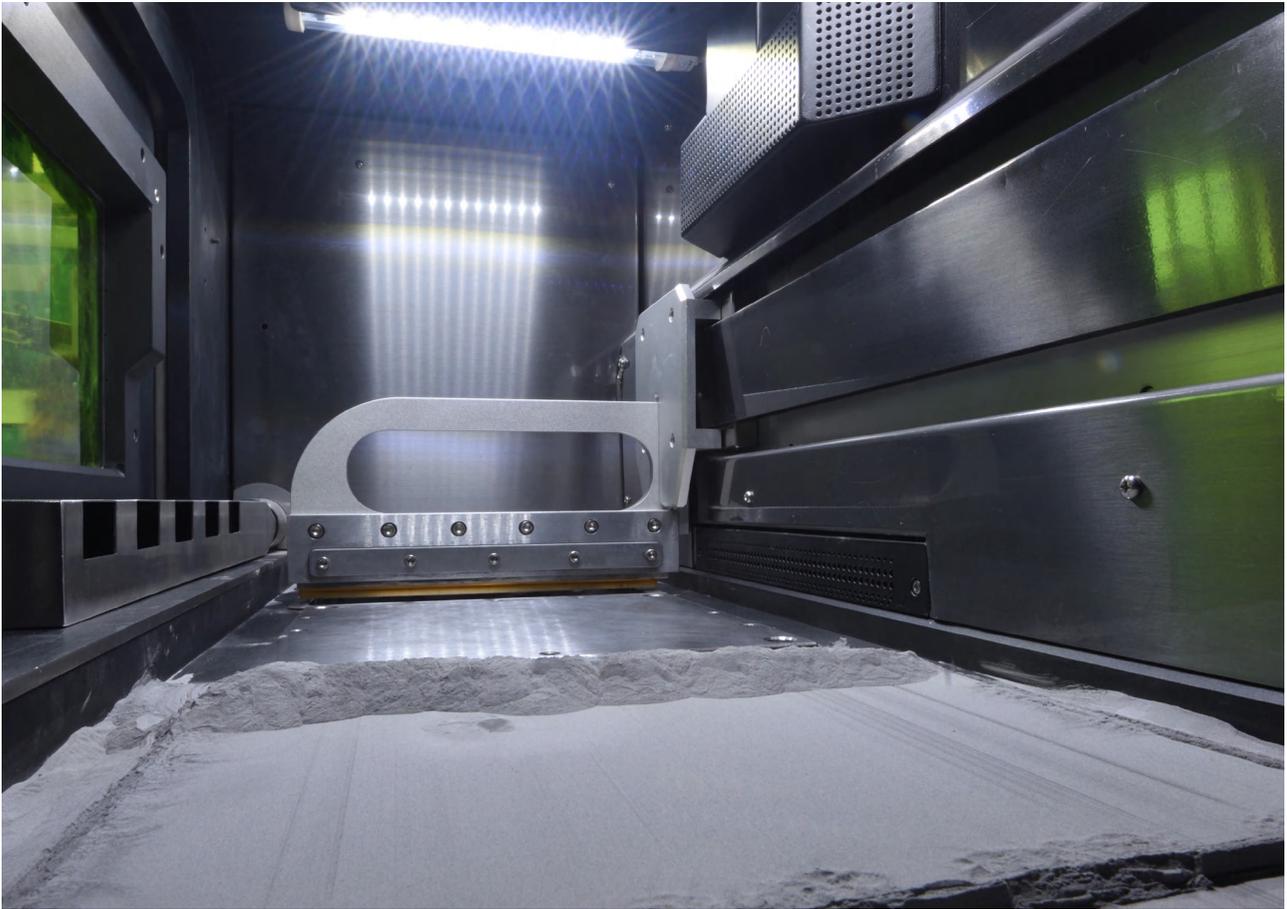
# Technical Specifications

## Print Genius 250

<b>DIMENSIONS (LxWxH)</b>	3500 (L) - 1250 (W) - 2240 (H)
<b>WEIGHT</b>	2500 kg.
<b>POWER SUPPLY</b>	380 V / 50 Hz / 10 kW
<b>LASER IR</b>	Laser Yb (Itterbio) IR single mode
<b>LASER POWER</b>	2 x 500 W
<b>LASER FOCUS DIAMETER</b>	70 – 100 µm
<b>BEAM WAVELENGTH</b>	1060 - 1080 nm
<b>BUILDING VOLUME</b>	258 x 258 x 350 mm
<b>BEAM DEFLECTION SPEED (DUAL SCANNER)</b>	2 * 8 m/s
<b>POSITIONING SPEED</b>	10 m/s
<b>BUILD RATE *</b>	25 - 50 cm <sup>3</sup> /h
<b>LAYER THICKNESS</b>	0.02 mm - 0.1 mm
<b>LAYER WIDTH</b>	0.1 mm (single line width)
<b>BUILDING PLATFORM Z-AXIS</b>	Travel: 430 mm / Speed: max 6 mm/s / Res: 0.01 mm
<b>HEATING PLATFORM</b>	up to 200°C
<b>MONITORING OF O2 LEVEL</b>	Below 100 ppm (0.01%)
<b>PERMISSIBLE ROOM TEMPERATURES</b>	15 - 30°C
<b>GAS (Consumption - running)</b>	6 L/min (running)
<b>SYSTEM FILL CONSUMPTION</b>	50 L / min. (up to filling)
<b>CAM SOFTWARE</b>	Materialise Magics
<b>CONTROL &amp; OTHER SOFTWARE</b>	Eplus control software (EPC)
<b>INDUSTRIAL INTERFACES</b>	Ethernet

\*Dependent on process parameters and material used

- Size & Power
- Laser
- Machine and additive process details
- Peripheral & auxiliaries - Software



## POWDER BED FUSION MACHINES FEATURES

Compact machines with a build platform surface from  $\varnothing$  150 mm to 258x258 mm and a build heights from 160 to 350 mm for the fabrication of small and medium sized components.

Optimised gas flow for minimum nitrogen or argon consumption. Complete material change capability in less than 2 hours due to modular and easily removable components.

A fiber laser source available in single or dual configuration of 500W each and a laser focus diameter of 70 - 100  $\mu$ m. A single linewidth of 0.1 mm and minimum layer thickness of 0.02 mm can be achieved for high precision. A reliable and compact scanning head offers high processing speeds and different scanning strategies.

An intelligent control and operating software for quick part orientation and machine functions definition. With an easy to use process parameter tool, the user can also modify critical printing aspects, select scanning strategy and export files readable by the machine.

Equipped with one filter unit (20 m<sup>2</sup> of filtering area) configuration or two line of filters for the recirculation of the gas inside the work area. The two line decrease the frequency of changing filter cartridges, and allow to change the filter during the process. The filter unit maintains a high degree of cleanliness of the machine, minimizing the replacement of parts subject to wear.



Simple operations and set up activities



Automatic collection of excess powder not deposited during the process



Intuitive software interface to monitor the process



Safe powder management through a glovebox access door

# Laserdyne® 811

DIRECT ENERGY DEPOSITION



## THE FASTEST SOLUTION FOR 3D FABRICATION, REPAIRING AND CLADDING WITH QUALITY AND ACCURACY

The latest development from Prima Additive in direct energy deposition additive manufacturing process. The machine provide precision and flexibility for a wide variety components. The machine is equipped with one of the fastest laser processing systems in the industry. The controller supports 7 axes of simultaneous motion, and integrated automation to load and unload component and subassemblies, i.e. robotic, automated stock inputs, turn-table, or out feed platform.

### FLEXIBLE



A single machine that supports additive, welding, drilling and cutting 3D and 2D Components. With the BeamDirector® and quick change nozzles, in a matter of a second the machine can be changed from additive, welding to drilling or to cutting. The machine can be equipped with 3 axes configuration or up to 7 axes.

### RELIABLE



The machine encompasses over 40 years engineering and industrial laser processing expertise. The LASERDYNE® have strong reputation for consistently and quickly manufacturing quality components.

### EFFICIENT



Higher overall equipment efficiency due reduced downtime and maintenance. Less resources dedicated to maintaining the machines. More efficient use of floor space for the total working envelope.

### INERT CHAMBER



The machine is designed to be equipped with an inert chamber option in order to print reactive materials such as Aluminum and Titanium. The inert chamber reaches 50 ppm of oxygen concentration in all the working volume and it is possible to remove the entire building volume thanks to a pre-chamber without loose inert atmosphere inside the working chamber.

### INNOVATIVE



The machine can be equipped with **REAL\_DED** (REal-time Adaptive Laser beam for Direct Energy Deposition) laser deposition head, developed and patented by Prima Additive to increase the performance and the efficiency of the deposition process and let the end-user to adapt the laser beam spot dimensions in real-time during the process.

# Technical Specifications

## Laserdyne® 811

<b>DIMENSIONS</b>	System: 2800 (L) - 6780 (W) - 3500 (H) mm
<b>WEIGHT</b>	9550 Kg
<b>POWER SUPPLY</b>	480 V / 60 Hz / 24 kW
<b>LASER IR</b>	Fiber Laser Yb, CW multimode, 1-6 kW, IR 1070-1080 nm
<b>WORKING VOLUME</b>	1100 x 800 x 600 mm
<b>AXES (CONFIGURATION 3 AXES)</b>	X = 1100 mm Y = 800 mm Z = 600 mm
<b>HEAD AXES</b>	BeamDirector® (C-D): axe C +90 -90 degrees Axe D +90 - 90 degrees
<b>AXES VELOCITY</b>	X-Y-Z >50 m/min BeamDirector® (C-D): 0-30 rpm
<b>RESOLUTION</b>	BeamDirector® (C-D): 0.005 degrees
<b>ACCURACY</b>	Linear (X-Y-Z): 25 µm bi-directional BeamDirector® (C-D): +/- 15 arc-second
<b>REPEATABILITY</b>	Linear (X-Y-Z): 25 µm bi-directional BeamDirector® (C-D): +/- 15 arc-second
<b>ROTOR TILT TABLE</b>	2 interpolated axes (Tilt & Rotation) standard load capacity 120 kg, optional 300 kg
<b>DEPOSITION RATE</b>	up to 100* cm <sup>3</sup> /h * Dependent on process parameters and material used.
<b>ROUGHNESS RA</b>	min 20 micron - typical 40 micron
<b>DEPOSITION ACCURACY</b>	+/- 0.2 mm / 2 mm
<b>POWDER FEEDER</b>	1 to 4 hopper (1.5 or 5 lt)
<b>CAM SOFTWARE</b>	MasterCam DED
<b>CNC SOFTWARE</b>	S94P Prima Power

- Laser
- Machine and additive process details
- Peripheral & auxiliaries - Software

# Laser Next 2141

DIRECT ENERGY DEPOSITION



## THE LARGE SCALE DEPOSITION SOLUTION WITH LARGE WORKING ENVELOPE FOR 3D FABRICATION, REPAIRING AND CUSTOMIZATION

The Laser Next 2141 combines the efficiency and productivity of the other Laser Next products with unique flexibility. Thanks to multiple machine configurations (fixed tables, split cabin, shuttles and turn table) it can meet any production need. Laser Next 2141 is a multipurpose solution developed and designed for large-part processing and jobshop production with advanced technology for different additive applications.



### FLEXIBLE

Different applications with a single machine. Direct Energy Deposition, 3D cutting, 2D cutting and welding in a single multipurpose solution with multiple machine configurations.



### HIGH-CAPACITY

Very large working envelope for large parts processing combined with reduced footprint.



### RELIABLE

Fully tested and reliable thanks to the experience of the successful Laser Next platform.



### ACCURATE

High precision, with no backlash or wear, thanks to the linear motor-driven focusing head and optical scales on main axes and on the focusing head.



### EFFICIENT

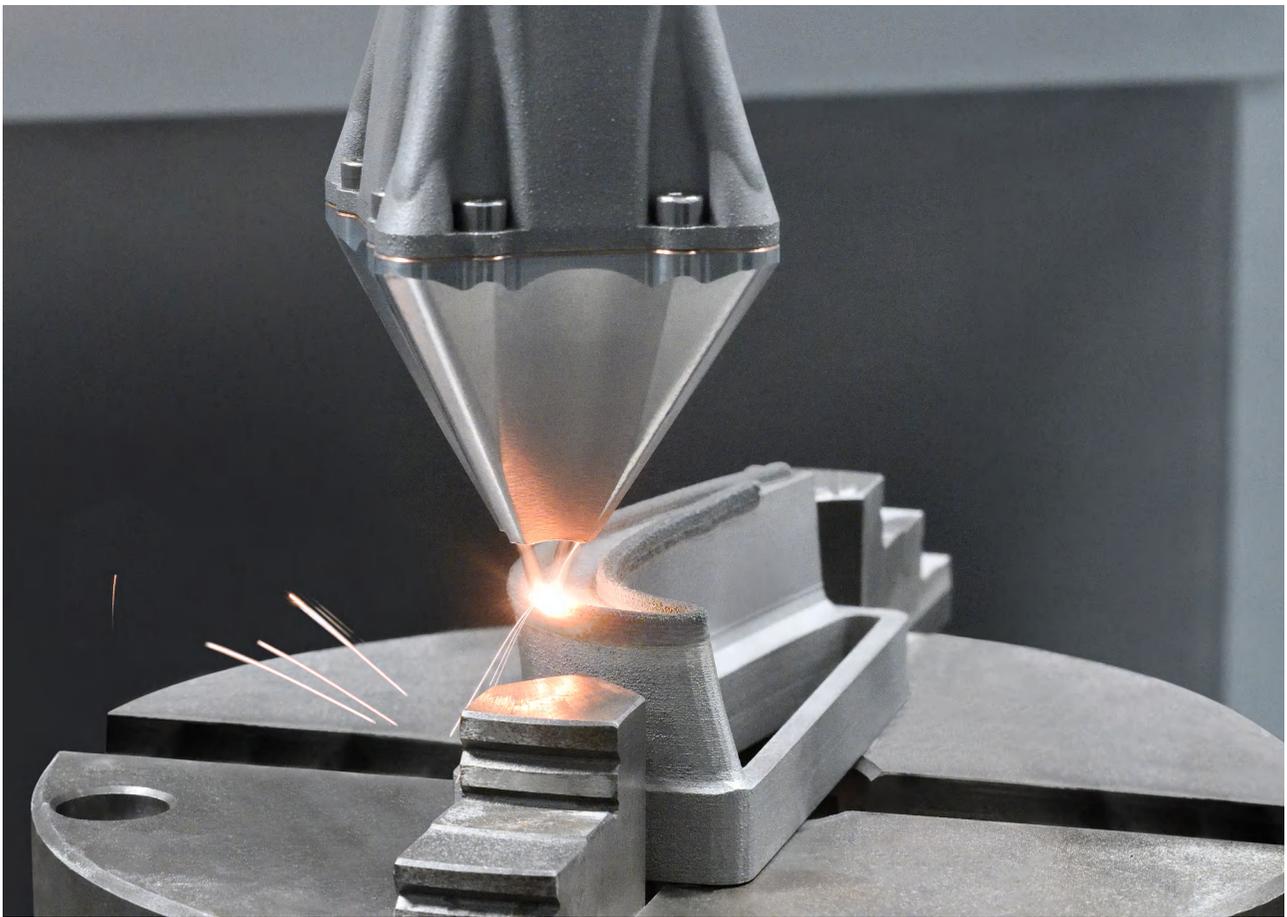
Higher Overall Equipment Efficiency due to reduced downtime and maintenance. Less resources dedicated and no special skills needed for simplified maintenance.

# Technical Specifications

## Laser Next 2141

<b>LASER POWER</b>	1 - 6 kW
<b>TYPE OF LASER</b>	Fiber Laser Yb, CW multimode
<b>BEAM WAVELENGTH</b>	1,070 - 1,080 nm
<b>WORKING VOLUME</b>	4,140 x 2,100 x 1,020 mm
<b>AXES CONFIGURATION</b>	5 axes
<b>AXES STROKES</b>	X = 4,140 mm Y = 2,100 mm Z = 1,020 mm
<b>HEAD AXIS</b>	A = 360° continuous B = +/- 135° C = +/- 12 mm
<b>AXES VELOCITY</b>	X, Y, Z = 120 m/min A, B = 540°/s (1.5 rev/s) C = 50 m/min TRAJECTORY = 208 m/min
<b>ACCURACY</b>	X, Y, Z = 0.03 mm A, B = 0.005°
<b>ACCELERATION</b>	X, Y, Z = 1 g A, B = 9.5 rev/s <sup>2</sup> C = 4 g TRAJECTORY = 1.73 g
<b>ROTARY OPTION</b>	2 axes Rotation (load capacity option)
<b>MAXIMUM OVERALL DIMENSIONS</b>	4,650 mm x 7,400 mm x 4,450 mm
<b>WEIGHT</b>	22,000 kg
<b>DEPOSITION RATE</b>	up to 100* cm <sup>3</sup> /h * Dependent on process parameters and material used.
<b>ROUGHNESS RA</b>	min 20 micron - typical 40 micron
<b>DEPOSITION ACCURACY</b>	+/- 0.2 mm
<b>POWDER FEEDER</b>	1 to 4 hopper (1.5 or 5 lt)
<b>CAM SOFTWARE</b>	MasterCam DED
<b>CNC SOFTWARE</b>	P30L Prima Power

- Laser
- Machine and additive process details
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## DIRECT ENERGY DEPOSITION MACHINE FEATURES

- | Direct Energy Deposition machines are based on a Laser Metal Deposition process that uses focused thermal energy generated from a laser source to fuse powder metal sprayed at the focal point of the laser beam. This laser beam melts the deposited powder to the component.
- | The laser is coaxial to the deposition head which moves in 3 to 5 simultaneous axes. A rotary tilt table can also be installed in order to keep the melt pool created in a horizontal plane. This capability makes the process suitable for adding features to existing parts as well as for repairs and coatings.
- | The machines could be equipped with modular powder feeder suitable for rapid change of material processed or for back-up to increase powder reserve and for processing two material simultaneously.
- | An additive/hybrid manufacturing intuitive software to program additive toolpaths and machining toolpaths with the possibility to control all the additive process parameters like the spot size, travel speed, laser power, shielding gas and powder flow settings.



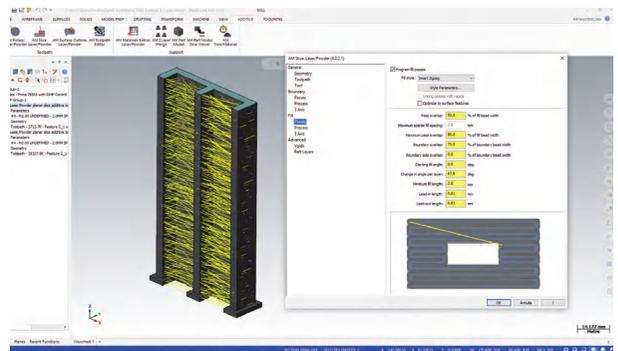
A modular powder feeder suitable for rapid change of material processed or for back-up to increase powder reserve



Possibility to add 2 more axes with a tilt rotary table



Intuitive machine interface for easy part set up and printing



Easy-to-use cad/cam software interface for simple job preparation and toolpath simulation

# Direct Energy Deposition Kit

## MODULAR DED KIT FOR REPAIR/3D APPLICATION

The DED kit includes all the equipment needed for direct energy deposition applications: an innovative and multi-purpose laser head, a highly efficient laser source and a flexible and reliable powder feeder. Prima Additive can offer the main components together or separately, allowing the retrofit of any laser machine or the integration on any type of robotic arm and structure.



### MODULAR

Modular design allows the laser head to be mounted in different configurations (straight, 90 degrees, with or without monitoring system). Easy installation on any type of machinery and easy maintenance of all the components of the DED kit.



### FLEXIBLE

The kit can be integrated with any laser machine and robotic system. Possibility to satisfy different requests related to laser power, laser head configuration, process monitoring system, type and capacity of the powder.



### EFFICIENT

The new nozzle design allows better powder use, while the fiber laser designed to offer high performance and efficiency guarantees low maintenance operations.



### PROFITABLE

Low cost of ownership along with a wide network of suppliers for materials and consumables.

## MAIN FEATURES

**Laser head:** Modular and innovative laser head, designed to accommodate different laser processes and DED requirements. The laser head can be assembled in order to provide melt-pool monitoring (high speed camera), pressurized optical path to avoid powder infiltration and water cooled additive-made nozzle for continuous additive depositions reducing powder adhesion risk during the process. Easy maintenance (cover glass and focal lens replacement), easy alignment of powder/laser spot and integration in any machinery and robotic systems.

**Powder feeder:** A powder feeding system developed to offer the maximum flexibility and accommodate different materials. With the possibility of up to 4 powder hoppers and a capacity for up to 5.5 liters each, the system can be easily connected with any control system. Optional heating mats to keep the powder pre-heated, gas flow controller and powder level sensors.

**Laser source:** The highly efficient and compact CF series high power fiber lasers, guarantees low maintenance operation, high reliability and superior process performances. Convergent Photonics Fiber lasers are very easy to integrate in different machine configurations.

**Other options:** Along with the DED kit, Prima Additive can provide the rest auxiliaries for DED process such as sieving system, vacuum cleaner as well as the AMxpress software plug in (CAM) modified for any machinery.

# DED Kit

## DED laser head

- Laser power up to 4 kW
- Internal clear aperture: 35 mm
- Coaxial 4 beam nozzle for high deposition rate (different configurations)
- Working distance (standoff): 8.5-9 mm
- Central purge gas line
- Camera module for monitoring system
- Light aluminum structure: 8 kg



## Powder feeder

- 1 to 4 hopper (0.5 – 5.5 l)
- Power supply (230V / 110V - 50Hz/60Hz)
- Heating mats (optional)
- Level monitoring powder (optional)
- Float flow controller (optional)
- Electronic mass flow controller (optional)
- External interfaces: 0-10 v signal (analogue) or digital interfaces



## Laser source

- Laser power: 1-6 kW
- Type of laser: fiber
- Beam wavelength: 1070 – 1080 nm



## Other Options

### (CAM software, siever, vacuum cleaner)

- AMXpress software plug in (optional)
- Sieving system and vacuum cleaner (optional)

# Prima Additive Services: key to easier Additive Manufacturing adoption

We believe in long-term partner relationships, and the key product we deliver to our customer is not just the machines and applications, but the manufacturing capacity that our customer can achieve with our products and technology. The heart of Prima Additive service is the common goal we share with our customer: supporting, training, operating, protecting your output to guarantee performance. Our Service covers the whole life cycle of the system and technology and contributes to reach one goal: maximise the added-value and the profit for you, our customer.



## TELESERVICE

Remote diagnostic and assistance. Skilled service engineers are available to operate remotely with your machines in real time.



## FIELD SERVICE

Both preventive maintenance and high-quality corrective maintenance to guarantee fast recovery when there is a problem. With more than 13,000 machines installed in more than 80 countries, we are able to give you the required assistance in your language.



## SERVICE AGREEMENTS

We customise service agreements to your needs.



## SPARE PARTS

Original Prima Additive spare parts to guarantee full performance and prolonged durability maintained in your local hub for rapid delivery.



## CONSULTATION

Wide range of consultation services on machine operation, programming and maintenance.



## TRAINING

Training programs and updates for using our machines and software to their best, maximising manufacturing capacity and quality.

### Want to know if additive manufacturing is the best solution for your business?

Contact us, we can help you establish materials, machines and production process that most benefits your business. Go to [www.primaadditive.com/get-a-free-application-study](http://www.primaadditive.com/get-a-free-application-study) and upload your 3D model. Our engineers will analyze your business case and they will send you the full application study. For free.

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# Contacts

STEP INTO THE NEW FRONTIER OF MANUFACTURING  
WITH PRIMA ADDITIVE

Contact us for more details about the Prima Additive product  
range and discover how your business could be future-ready as  
early as today.

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